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Metacognition is a key component in education, yet little is known about whether or not instructional leaders are metacognitively aware. Metacognition is described as thoughts about one's knowledge and control over their own cognitive processes (Flavell, 1979). Kuhn (2000) indicated that metacognition develops from an early age, and asserted that the more explicit metacognitive thinking is, the more effective one would be able to engage in metacognitive thinking and control of their cognitive processes. Some examples of metacognitive strategies include planning, monitoring, and evaluating, and can be used by educators or students (Fathima, Sasikuman, & Roja, 2014). Metacognitive strategies should be selected based on tasks, contexts, and an awareness of situational activities (Bjork, Dunlosky, & Kornell, 2013).

Schmitt and Newby (1986) recognized that metacognitive strategies should be incorporated into instruction. Research demonstrates that when students engage in metacognitive practices, they are more successful in academics (see Finley, Tullis, & Benjamin, 2010, for a review). However, at the time of the current study, there is little research on teachers' and school leaders' awareness of metacognition in daily practice.

In order for educators to teach students to think metacognitively, they must think metacognitively themselves. This metacognitive awareness must be significant to the extent that educators are able to recognize metacognitive thinking in their own students (Prytula, 2012). Veenman, Van Hout-Wolters and Afflerbach (2006) noted "many teachers lack sufficient knowledge about metacognition" (p.10.) However, a study conducted by Wilson and Bai (2010), which examined teachers' knowledge of metacognition and how this knowledge affected their pedagogy, found teachers had a general understanding of metacognition. The teachers also recognized they needed more professional development in metacognition to implement more effective strategies in their classroom. Jiang, Ma, and Gao (2016) also asserted that teachers who are metacognitively aware will experience greater benefits in their teaching practice, which will result in greater student learning.

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According to Georghiades (2004), it is the responsibility of school leaders to ensure that metacognitive strategies are taught in our classrooms. In order for school leaders to provide opportunities for teacher development of metacognition, they must be able to think in a metacognitive fashion, exhibiting an awareness of their own metacognitive processes. At this time, we could not find any research on school leaders' metacognitive awareness. Therefore, one goal of our study was to measure school leaders' awareness of metacognition. In summation, in order for students to learn to regulate their metacognitive processes, it is essential that principals value and exhibit this complex cognitive process and facilitate opportunities for teachers to learn more about their own metacognitive processes. Teachers must be aware of their own metacognitive processes to teach students to think metacognitively.

Mindset and Education

Though school leaders do not have a direct effect on student achievement, their actions and mindset indirectly affect student outcomes (Wallace Foundation, 2012). To ensure students are engaged in metacognitive strategies in the classroom, school leaders need to encourage their teachers to grow professionally in this area. Research indicates that effective teacher learning and growth comes from continuous professional development (Darling-Hammond, 2010). Instructional leaders can influence and reinforce staff development through both direct and indirect methods. Staff development opportunities do not necessarily need to be intentional. Opportunities for learning and growth can occur through school-wide leadership teams (Yager & Yager, 2010), faculty study groups (Mullen & Hutinger, 2008), and professional learning communities (Prytula, 2012). In order for changes to occur to the school norms about growth mindsets, training is necessary (Guidera, 2014).

Gold, Evans, Earley, Halpin and Collarbone (2003) noted the attitudes and dispositions of the school leaders affect the quality of education within their respective school settings. Specifically, a principal that adheres to a growth mindset will lead others to value learning (Murphy & Dweck, 2009). Manning (2007) described that, in order for a growth mindset to occur, educational leaders need to be open to feedback and learning opportunities themselves, as opposed to limiting growth potential due the perceived threat of failure. Superintendents and principals may assume that certain leadership characteristics are fixed and cannot be changed. Bambrick-Santoyo (2013) explored if a growth mindset-coaching program could improve current principals' leadership skills. The results of the case study indicate that small chunks of feedback, easily incorporated into the classroom coaching routine, afforded an opportunity to practice new methods and improve as a leader. This "unfamiliar" practice in terms of instructional leaders and principals buts a focus on growth mindset in leadership (Bambrick-Santoyo, 2013).

Whether growth mindset occurs naturally or it is intentionally developed, it can help leaders become more effective in development of skills needed to lead a school (Kearney, Kelsey & Herrington, 2013). Again, the literature does not specifically address measuring school leaders' mindset. A second goal of this study is to assess future and current school leaders' mindset.

Based on the research available at the time this study was conducted, we sought to answer the following three questions:

1. What is the level of metacognitive awareness in school leaders?

2. Is there a relationship between school leaders' mindset and their metacognitive awareness?
3. Is there a difference between future and current school leaders' mindset and/or their metacognitive awareness?

Methods

Design and Procedures

A list of principals in the state of Alabama was obtained through the Alabama State Department of Education website. Using the email provided on the list, individuals were sent an invitation to participate in the study through Qualtrics. A follow-up email was sent to participants who had started the survey and not finished, or had yet to begin the survey. Current and former instructional leadership students at a medium-sized university in the Southeast were also sent an invitation via email to participate in the study. Any duplicate emails from the original list of current principals were eliminated. Again, a follow-up email was sent to those who had begun the survey but not finished as well as those who had not started.

Participants

Current principals in the state of Alabama were included in the study as well as current and previous instructional leader students at a mid-size southeastern university. Eighty-five surveys were collected in the study, but 16 respondents' information could not be included due to incomplete surveys (see Table 1). The final sample included 69 participants. Sixty-three percent were current principals and 58% of the sample was female. Ten participants held leadership positions as either a lead teacher or department chair.

Instrumentation

The data for this study was collected using a survey. The survey contained three parts: Demographic questions, the Metacognitive Awareness Inventory for Instructional Leaders, adapted from the Metacognitive Awareness Inventory for Teachers (Balcikanli, 2011) and a Mindset Quiz (adapted from Dweck, 2006).

Metacognitive Awareness Inventory for Instructional Leaders (MAIIL)
The Metacognitive Awareness Inventory for Teachers (MAIT) was created to measure teachers' metacognitive awareness. The MAIT is based on Schraw and Dennison's (1994) Metacogntive Awareness Inventory that contains 42 items and 6 subcategories: declarative knowledge, procedural knowledge, conditional knowledge, planning, monitoring, and evaluating. The MAIT contains 24 questions that are divided into the same six subcategories. The MAIT was found to be valid and reliable (declarative knowledge α =.85, procedural knowledge α = .82, conditional knowledge α =.84, planning α =.81, monitoring α =.80 and evaluating α =.79) in measuring teachers' metacognitive awareness (Balcikanli, 2011). The MAIT was adapted to reflect instructional leadership instead of teaching. To do this, words related to teaching were substituted with words related to leadership. For example, "I am aware of the strengths and

weaknesses in my teaching" was changed to "I am aware of my strengths and weaknesses in my leadership abilities."

Table 1.
Demographic Statistics of Survey Respondents

	Current Principals	Future Principals
Sex		
Male	23	6
Female	21	19
Ethnicity		
African American	8	12
White	34	13
Native American	0	0
Hispanic	0	0
Asian	1	0
Other	1	0
Age		
23-27	0	1
28-32	2	6
33-37	3	4
38-42	10	5
43-47	8	4
47 and Over	20	4
Area of Specialization		
Elementary	22	2
Secondary	19	1
Educational Coach	0	2
Pre-School Director	0	1
Other	3	19
Degree		
M.Ed.	11	8
Ed.S.	15	10
Ph.D./Ed.D.	18	7

Mindset Quiz

The original Mindset Quiz (Dweck, 2006) contained 8 items and was adapted by the National Council for Community and Education Partnerships (2016). The revised instrument contained 20 items and each of these statements was identified as either a fixed or growth mindset statement. A 4-point Likert Scale was used ranging from Strongly Agree to Strongly Disagree. When participants answered growth mindset questions, such as, "No matter how much intelligence you have, you can always change it quite a bit," with "Strongly Agree," they were assigned 3 points. When participants answered fixed mindset question, such as, "I often get angry when I get feedback back about my performance," with "Strongly Agree," they were assigned 0 points.

A total score was calculated based on the 20 statements, then scored using the following scale:

60-45 points= strong growth mindset
44-34 points=growth mindset with some fixed ideas
33-21 points= fixed mindset with some growth ideas
20-0 points=strong fixed mindse

Results

Reliability analysis was run on each measure using Chronbach's Alpha. The adapted instrument, MAILL, was found to be reliable (α =.841). With the current sample, the mindset quiz does not appear to be reliable (α =.230). This measure did vary from Dweck's original measure but also this measure has not been tested with school leaders. An additional concern is the limited sample size. Li and Bates (2017) recently called into question the reliability of Dweck's mindset research in regards to student mindset and achievement. Based on the current reliability results and the findings of Li and Bates, results related to mindset are discussed with caution. The Levene's test of homogeneity of variance was employed because of the variance in group sizes (current principals, N=44, future principals, N=25). For each of the measures, no significant differences were found, therefore equal variances were assumed with the independent sample t-tests. Independent sample t-tests were used to see if there were differences between the current principals and future principals in metacognitive awareness (MAILL). There was a statistically significant difference between current principals and future principals with respect to their declarative knowledge and planning. The size of the effects for declarative knowledge (d= .50) and planning (d=.58) are a medium effect (Cohen, 1992). This indicates that those who are principals do have a better understanding of what they know about being an instructional leader and understand how to plan to meet their goals. There were no statistical differences in the other MAILL subscales or with the total score. With the means closer to 1 or 2 (see Table 2), this indicates most participants were practicing metacognitive strategies. They were aware that they needed to plan, monitor and evaluate their learning as it relates to instructional leadership practices.

Though there was not a statistically significant difference between these groups on the Mindset Quiz, both groups' mean scores indicate they have a growth mindset with some fixed ideas. An analysis of the fixed mindset questions was conducted to identify agreement with the fixed mindset ideas. Two questions yielding a low agreement with a fixed mindset view of intelligence were found. Specifically, both groups agreed with the following "personality/character mindset-fixed" statements: "Some people are good and kind and some are not- it's not often that people change" (M=1.62, SD=.621) and "You can do things differently, but the important parts of who you are can't really be changed" (M=1.78, SD=.639).

The final step in the analysis was to see if there was any correlation between their level of metacognitive awareness and mindset. There were no significant correlations between the measures.

Table 2

Results of Independent Sample t-tests and Descriptive Statistics for Metacognitive Awareness Inventory for Instructional Leaders and Mindset Quiz

	Current Principals (N=44)	Future Principals (N=25)	95% CI for Mean Difference	t	df
MAIIL	*M* (SD)	*M* (SD)			
Declarative Knowledge	1.37 (.326)	1.55 (.395)	-.357, -.004	-2.05*	67
Procedural Knowledge	1.60 (.370)	1.64 (.375)	-.229, .143	-.47	67
Conditional Knowledge	1.46 (.328)	1.52 (.314)	-221, .102	-.73	67
Planning	1.85 (.452)	1.57 (.481)	.045, .508	2.39*	67
Monitoring	1.65 (.579)	1.50 (.500)	-.128, .424	1.07	67
Evaluating	1.46 (.438)	1.35 (.451)	-.111, .331	.99	67
Total	1.56 (.295)	1.52 (.309)	-.109, .192	.55	67
Mindset Quiz	39. 70 (3.32)	38.48 (3.13)	-.404, 2.85	1.50	67

*p <.05.

Discussion and Implications

Those surveyed indicated a general metacognitive awareness as it relates to instructional leadership. Scores on the Metacognitive Awareness Inventory for Instructional Leaders indicated that current and future principals think about their thinking. Specifically, they plan for, monitor and evaluate their thinking in relationship to their leadership. The differences between current and future principals in the areas of declarative knowledge and planning indicated that practice or experience may play a role in making one more aware of these components of leadership. It is possible that one must be immersed in the schools to metacognitively aware of the knowledge necessary for leading in schools and the planning involved in that task.

The instructional leaders in this study exhibited an overall growth mindset with a subset of fixed ideas. This is significant from both a leadership and educational perspective because it is reflective of the belief held, by the leaders/future leaders surveyed, that people can grow when provided opportunities to learn. This is consistent with prior research implications (Manning, 2007; Bambrick-Santoyo, 2012). As Murphy and Dweck (2009) noted, this type of thinking from the perspective of instructional leaders, will resonate and filter down to teachers and classrooms in schools. Leaders will begin to value professional development opportunities to learn and practice metacognitive strategies, and, in turn, encourage their faculty and students to seek out opportunities to grow accordingly.

Professional Development Opportunities in Metacognition

In recent years, there is a movement away from "top-down" professional development and towards teacher-led development. In the past, central office administration or principals have

selected the professional development activities for their staff, based on what they deemed a "need" on their campus. This change is a result of how power and leadership is distributed in buildings. Many schools have moved to a distributed leadership model and, as a result, teachers and administrators are encouraged to make decisions about professional development together (Harris & Spillane, 2008; Claudet, 2014, Valle, Almager, Molina, & Claudet, 2015). As Wilson and Bai (2010) demonstrated, teachers see the importance and relevance of metacognition in their classrooms, but are unaware of how they can implement metacognitive strategies with their students. Given the change in leadership-styles on many campuses, hopefully, there will be a shift towards more professional development opportunities in facilitating metacognitive strategies in the classroom.

Nichol and Turner-Bisset (2006) asserted that educators need opportunities to engage in cognitive apprenticeships which enable them to use metacognitive strategies, immediately, following professional development. Based on this, in more traditional educational settings, instructional leaders could begin by surveying their faculty to determining levels of awareness of metacognition, and its importance in education. Following this, leaders could develop and facilitate professional development sessions which would promote an awareness of metacognitive strategies. These strategies could immediately be accessible for use in the classroom setting to afford both students and teachers with experiences in thinking at a metacognitive level. Additionally, leaders could provide supports that would help students plan for, evaluate, and monitor their learning.

At present, Li and Bates found, "mindsets and mindset interventions effects on both grades and ability, however, were null or even reversed from the theorized direction" (pg. 22). It seems promoting growth mindset as a strategy to increase academic outcomes has some flaws. What is clear from the current research, is using effective teaching strategies, will lead to student growth and progression (Hattie, 2009; Hattie, 2012). School leaders and instructional coaches can ensure best practices are occurring in the classroom by offering professional development related to metacognition and not growth mindset.

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